Invited session title : Human-centric methods for knowledge engineering and knowledge management in industry 5.0 manufacturing systems   **Code: 43b73**

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Keywords : Knowledge Engineering, Knowledge Management, Knowledge Based Systems, Ontologies, Knowledge Graphs, Manufacturing Systems.

Knowledge Engineering (KE) and Knowledge Management (KM) are important processes, particularly within industry 5.0 manufacturing systems. KE refers to the process of designing, building and maintaining systems that apply and manage knowledge. It involves capturing, formalizing, structuring and implementing knowledge so that it can be used to solve complex problems. KM refers to the process of creating, sharing, using, and managing the knowledge and information of an organization. It aims to improve organizational effectiveness by ensuring that knowledge is systematically captured, stored and made available to employees and stakeholders. The Industry 4.0 era is characterized by increased digitalization, while Industry 5.0 places greater emphasis on the role of humans. Managing digital assets — such as information, experiences, and knowledge — is becoming increasingly important. The implementation of effective robust human-centric KE and KM strategies for acquiring and utilizing available knowledge is essential for building sustainable competitive advantages and promoting organizational learning and innovation. In manufacturing systems, efficient human-centric KE and KM are necessary along the systems life-cycle: design or configuration of new products or systems, manufacturing, supplying, delivering, operating, maintaining, dismantling, etc.

In the context of Small and Medium-sized Enterprises (SME), dedicated approaches that are simple, responsive, collaborative, and adaptable are necessary in order to deal with low expertize and capacity of individuals to engineer and manage knowledge. Individuals in SMEs are typically focused on day-to-day value-adding business activities, leaving them with limited time to effectively address KE and KM tasks such as formalizing domain-specific knowledge, solving problems and capitalizing solutions for future reuse, establishing new manufacturing standards, conducting expert evaluations. New approaches and emerging technologies such that Digital Twins (DT) or Cyber Physical Systems (CPS) are useful to design, implement and control manufacturing systems in the industry 5.0 context. Closely connected to humans, they can offer solutions to efficiently manage the knowledge necessary to employees to realize their activities and solve problems. Formalisms such ontologies and knowledge graphs are also useful for KE and KM. Ontologies provide formal representations of concepts within a domain and their relationships and reasoning mechanisms allows to use knowledge and help to solve problems. Knowledge Graphs focus on the actual representation of entities and their relationships in a structured format. They allow querying and retrieval based on relationships. Together, they enable powerful knowledge management and retrieval capabilities.

This invited session objective is to bring together researchers and practitioners in the field of human-centric Knowledge Engineering and Knowledge Management for industry 5.0 manufacturing systems. It offers an interactive environment for discussing and disseminating new ideas, methods, tools or approaches to help individuals to better engineer and manage knowledge when carrying out activities along their projects or business processes within manufacturing systems. The topics may include (but are not limited to):

- Knowledge management for problem solving and continuous improvement in manufacturing systems
- Knowledge engineering and knowledge management for Systems Engineering
- Human-centric knowledge engineering: models, techniques and method to help humans to better engineer and manage their personal knowledge in organizations
- Personal Knowledge Management towards Organizational Knowledge Management in manufacturing systems: models, methods and processes for transforming Personal Knowledge into Organizational Knowledge
- Experience engineering and Experience management: models, techniques and methods to better formalize and manage human experiences within socio-technical organizations
- Knowledge Management and Digital Twins: models, methods and techniques to better formalize, capitalize and disseminate knowledge across human-centric manufacturing organizations
- Knowledge Engineering and Knowledge Management in Small and Medium-sized Enterprises (SMEs): dedicated models, methods and processes
- Ontologies and Knowledge Graphs as key drivers for sustainable industry 5.0 manufacturing processes

Important dates:

- Draft paper submission: 30st November 2024

- Notification of acceptance: 30th January 2025

- Final paper submission: 28th February 2025